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EXAMINER	
MCCARTHY, CHRISTOPHER S	
ART UNIT	PAPER NUMBER
2113	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/092,007	AIELLO ET AL.	
	Examiner	Art Unit	
	Christopher S. McCarthy	2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *response to arguments*.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 24 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Electromagnetic signals are deemed non-statutory as a form of natural phenomena. Suggested correction is a computer-readable medium containing computer-readable instructions, which are executable to perform the desired task. The signals in this case are likened to data structures when the signal is not contained a tangible computer-readable medium. The MPEP states "Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory)." The applicant is urged to place any code, whether embodied as a signal or as a data structure, on a computer-readable medium to contain the embodiment to perform the desired task.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5-6, 8-9, 22, 24, 25-26, 28-29, 31-35, 37-38, 40-44, 46-47, 49-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. U.S. Patent 6,883,108.

As per claim 1, Lee teaches a method for performing an input/output operation to a storage device from a computer, the method comprising the steps of: selecting a first data path from a set of data paths between the computer and the storage device; attempting the input/output operation using the selected first data path; selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and attempting the input/output operation using the selected next data path (column 9, lines 1-15).

As per claim 2, Lee teaches the method of claim 1 wherein the set of data paths is dynamically generated in response to storage device events (column 9, lines 45-55).

As per claim 3, Lee teaches the method of claim 2 wherein the storage device event further comprises a Fibre Channel loop initialization event (column 1, lines 16-21).

As per claim 5, Lee teaches the method of claim 1 wherein the storage device further comprises a disk drive (column 5, lines 18-20).

As per claim 6, Lee teaches the method of claim 5 wherein the disk drive is operatively interconnected with the computer by a Fibre Channel Arbitrated Loop (column 1, lines 16-21).

As per claim 8, Lee teaches the method of claim 1 wherein the set of data paths are described by a related set of data structures (column 14, lines 31-34).

As per claim 9, Lee teaches the method of claim 1 wherein the data paths utilize a Fibre Channel connection (column 1, lines 16-21).

As per claim 22, Lee teaches a computer-readable medium, including program instructions executing on a computer, for performing an input/output operation to a storage device having one or more data paths to the computer, the program instructions including steps for: selecting a first data path from a linked list of data paths to the storage device; attempting the input/output operation using the selected first data path; selecting, in response to an error in the input/output operation using the first data path, a next data path from the linked list of data paths; and attempting the input/output operation using the selected next data path (column 9, lines 1-15).

As per claim 24, Lee teaches electromagnetic signals propagating on a computer network, comprising: said electromagnetic signals carrying instructions for execution on a processor for the practice of a method for performing an input/output operation to a storage device from a computer, the storage device having one or more data paths to the computer, the method having the steps, selecting a first data path from a set of data paths to the storage device; attempting the input/output operation using the selected first data path; selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and attempting the input/output operation using the selected next data path (column 9, lines 1-15).

As per claim 25, Lee teaches the method of claim 1 further comprising: dynamically generating the set of data paths in response to a storage device event (column 9, lines 45-55).

As per claim 26, Lee teaches the method of claim 1 further comprising: dynamically generating the set of data paths in response to a Fibre Channel loop initialization event (column 1, lines 16-21).

As per claim 28, Lee teaches the method of claim 1 further comprising: performing the input/output operation to a disk drive as the storage device (column 5, lines 18-20).

As per claim 29, Lee teaches the method of claim 28 further comprising: interconnecting the computer with the disk drive by a Fibre Channel Loop (column 1, lines 16-21).

As per claim 31, Lee teaches the method of claim 1 further comprising: describing the set of data paths by a set of data structures (column 14, lines 31-34).

As per claim 32, Lee teaches the method of claim l further comprising: utilizing a Fibre Channel connection as a data path of the set of data paths (column 1, lines 16-21).

As per claim 33, Lee teaches a computer for performing an input/output operation to a storage device having one or more data paths to the computer, the computer comprising: means for selecting a first data path from a set of data paths to the storage device; means for attempting the input/output operation using the selected first data path; means for selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and means for attempting the input/output operation using the selected next data path (column 9, lines 1-15).

As per claim 34, Lee teaches the computer of claim 33 further comprising: means for dynamically generating the set of data paths in response to a storage device event (column 4, lines 45-55).

As per claim 35, the computer of claim 33 further comprising: means for dynamically generating the set of data paths in response to a Fibre Channel loop initialization event (column 1, lines 16-21).

As per claim 37, Lee teaches the computer of claim 33 further comprising: means for performing the input/output operation to a disk drive as the storage device (column 5, lines 18-20).

As per claim 38, Lee teaches the computer of claim 37 further comprising: means for interconnecting the computer with the disk drive by a Fibre Channel loop (column 1, lines 16-21).

As per claim 40, Lee teaches the computer of claim 33 further comprising: means for describing the set of data paths by a set of data structures (column 14, lines 31-34).

As per claim 41, Lee teaches the computer of claim 33 further comprising: means for utilizing a Fibre Channel connection as a data path of the set of data paths (column 1, lines 16-21).

As per claim 42, Lee teaches a system for performing an input/output operation between a computer and a storage device, comprising: a plurality of data paths between the computer and the storage device; a first data path selected from the plurality of data paths; a first software code in a routing administrator, to attempt the input/output operation using the selected first data path, a second software code to select, in response to an error in the input/output operation using the first data path, a next data path from the plurality of data paths; and a third software code to attempt the input/output operation using the selected next data path (column 9, lines 1-15; column 5, lines 56-58).

As per claim 43, Lee teaches the system of claim 42 further comprising: a plurality of data paths dynamically generated in response to a storage device event (column 9, lines 45-55).\

As per claim 44, Lee teaches the system of claim 42 further comprising: a plurality of data paths dynamically generated in response to a Fibre Channel loop initialization event (column 1, lines 16-21).

As per claim 46, Lee teaches the system of claim 42 further comprising: a disk drive as the storage device (column 5, lines 18-20).

As per claim 47, Lee teaches the system of claim 42 further comprising: a Fibre Channel Loop connecting the computer to a disk drive as the storage device (column 1, lines 16-21).

As per claim 49, Lee teaches the system of claim 42 further comprising: a data structure to describe the plurality of data paths (column 14, lines 31-34).

As per claim 50, Lee teaches the system of claim 42 further comprising: a Fibre Channel connection as a path of the plurality of data paths (column 1, lines 16-21).

4. Claims 10-21, 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheng et al. U.S. Patent 6,802,021.

As per claim 10, Cheng teaches a method for maintaining a set of data paths accessible by a set of upper level services of a storage operating system of a computer (column 4, lines 15-24), the method comprising the steps of: creating a device instance associated with a storage device (column 5, lines 25-45; column 6, lines 15-21); creating a first path instance associated with a first path to the storage device (column 2, lines 35-51); creating, in response to events identifying an addition of a path, an additional path instance associated with an additional path to

the storage device (column 5, lines 25-45; column 7, lines 23-26); and deleting, in response to events identifying a removal of a path, a path instance associated with the removed path (column 10, lines 15-20, wherein, disabling has the same functionality of deleting in this instance, in that, once a path instance is disabled, it is no longer used in the system).

As per claim 11, Cheng teaches the method of claim 10 wherein the step of creating a device instance occurs in response to receipt of an event identifying an addition of a storage device (column 7, lines 36-41).

As per claim 12, Cheng teaches the method of claim 10 wherein the events identifying an addition of a path is a Fibre Channel loop initialization event (column 6, lines 62-65; column 7, lines 37-41).

As per claim 13, Cheng teaches the method of claim 10 wherein the events identifying removal of a path is a Fibre Channel loop initialization event (column 6, lines 62-65; column 7, lines 37-41; column 10, lines 15-20).

As per claim 14, Cheng teaches the method of claim 10 wherein the step of creating an additional path instance further comprises the step of linking the additional path instance to a linked list of path instances associated with the storage device (column 5, lines 25-45).

As per claim 15, Cheng teaches the method of claim 10 wherein the device instance and path instances are accessible via an application program interface (column 5, lines 8-11).

As per claim 16, Cheng teaches the method of claim 10 wherein the set of upper level services further comprises a redundant array of inexpensive disks layer of the storage operating system (column 5, lines 55-59).

As per claim 17, Cheng teaches a computer for use with a plurality of storage devices having one or more data paths associated with the storage devices (column 4, lines 24-34), the computer comprising: means for detecting changes to the data paths associated with the storage devices (column 9, lines 11-15); means for maintaining a set of path instances associated with each of the plurality of storage devices, the data path instances accessible to a set of upper level services (column 5, lines 5-45); means for performing input/output operations to the plurality of storage devices using a first data path; means for selecting alternate data paths, in response to an error occurring with the first data path; and means for performing input/output operations to the plurality of storage devices using the selected alternate data paths (column 9, lines 11-15).

As per claim 18, Cheng teaches the computer of claim 17 wherein the upper level services access the data path instances via an application program interface (column 5, lines 8-11).

As per claim 19, Cheng teaches a storage operating system executing on a computer (column 4, lines 15-24), the storage operating system comprising: a routing administration layer, the routing administration layer dynamically updating a set of device instances, each device instance associated with a storage device (column 5, lines 25-45; column 9, lines 27-62); wherein each device instance includes at least one path instance, each path instance identifying a path from the computer to the associated storage device (column 5, lines 43-45); and a set of upper level services, the upper level services capable of accessing the device instances (column 5, lines 5-24).

As per claim 20, Cheng teaches the storage operating system of claim 19 wherein the routing administration layer further comprises an application program interface, the application

program interface providing the upper level services access to the set of device instances (column 5, lines 5-24; column 9, lines 27-35).

As per claim 21, Cheng teaches the storage operating system of claim 19 wherein the upper level services further comprises a redundant array of independent disks layer of the storage operating system (column 5, lines 55-59).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 4, 7, 27, 30, 36, 39, 45, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in View of Cheng et al. U.S. Patent 6,769,071 .

As per claim 4, Lee teaches the method claim 1. Lee does not teach wherein the first data path comprises a last used data path associated with the storage device. Cheng does teach wherein the first data path comprises a last used data path associated with the storage device (column 9, lines 24-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path

fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 7, Lee teaches the method of claim 1. Lee does not teach wherein the computer further comprises a file server. Cheng does teach wherein the computer further comprises a file server (column 4, lines 19-29; column 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 27, Lee teaches the method of claim 1, Lee does not explicitly teach selecting, as the first data path, a last used data path associated with the storage device. Cheng does teach selecting, as the first data path, a last used data path associated with the storage device (column 9, lines 24-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 30, Lee teaches the method of claim 1. Lee does not teach performing the input/output operation from a file server as the computer. Cheng does teach performing the input/output operation from a file server as the computer (column 4, lines 19-29; column 5, lines

2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 36, Lee teaches the compute of claim 33. Lee does not teach a means for selecting, as the first data path, a last used data path associated with the storage device (column 9, lines 24-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 39, Lee teaches the computer of claim 33. Lee does not teach a means for performing the input/output operation from a file server as the computer (column 4, lines 19-29; column 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 45, Lee teaches the system of claim 42. Lee does not teach the first data path is a last used data path associated with the storage device. Cheng does teach the first data path is a last used data path associated with the storage device (column 9, lines 24-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

As per claim 48, Lee teaches the system of claim 42. Lee does wherein the computer further comprises a file server. Cheng does teach wherein the computer further comprises a file server (column 4, lines 19-29; column 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of Cheng to the method Lee. One of ordinary skill in the art would have been motivated to combine the method of Cheng to the method Lee because Cheng teaches that rerouting communications in a storage network when a data path fails greatly increases system reliability (column 3, lines 9-13); this is an explicit desire of Lee (column 6, lines 32-36).

Response to Arguments

7. Applicant's arguments filed 7/21/05 have been fully considered but they are not persuasive.

With respect to claims 10 and 17, the applicant argues that Cheng does not teach wherein there is a distinct device instance and a path instance. The examiner contends that this distinct argument is not in the claim language. Moreover, in column 5, lines 37-45, Cheng teaches two device object instances and two path instances. This teaching fulfills the claim language as written with the requirement of only a device instance and two path instances.

In light of the above arguments, all applicable rejections stand.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: See attached PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher S. McCarthy whose telephone number is (571)272-3651. The examiner can normally be reached on M-F, 9 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on (571)272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

csm
September 23, 2005

ROBERT BEAUSOLIEL
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